GEOGRAPHIC NEWS BULLETIN

Published Weekly by

THE NATIONAL GEOGRAPHIC SOCIETY

(The National Geographic Society is a scientific and educational Society, wholly altruistic, incorporated under the Federal law as a non-commercial institution for the increase of geographic knowledge and its popular diffusion.)

General Headquarters, Washington, D. C.

CONTENTS FOR WEEK OF OCTOBER 22, 1923. Vol. II. No. 13.

1. Transjordania: Newest Independent Arab State.
2. What Causes an Earthquake?
3. School Days Around the World.
4. How Sugar Is Made.
5. Bulgaria Is Home of Costliest Perfume.

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A BIT OF FASHION IN BULGARIA, "WHERE THE PERFUME COMES FROM." (See Bulletin No. 5.)

HOW TO OBTAIN THE BULLETIN

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Transjordania: Newest Independent Arab State

WHETHER the newest Arab state to have its independence recognized be called by its Western title, Transjordania, or by its Eastern name, Kerak, it seems hopelessly out of touch with things American. It lies immediately east of the River Jordan and over it Emir Abdullah rules.

Perhaps it will bring the newly independent but very old country closer to realize that its capital, now Amman, was once Philadelphia—the great-great-grandfather of the half dozen or more Philadelphias, great and small, that are to be found in modern postal guides.

Ancestor of Modern Philadelphias

It was a mere matter of twenty-odd centuries ago that the city took the name Philadelphia from its new lord, Ptolemy Philadelphus. It had existed as Rabbath Amman, chief city of the Ammonites, almost from the days of Lot, from whom the Ammonites are said to have sprung. It was after a victorious battle with these same people of Amman that Jephthah, according to the Biblical story, returned to the fatal meeting with his daughter.

When Transjordania is described as stretching from the Jordan and the Dead Sea toward the interior of Arabia one is likely to call up the picture of a hopeless desert. But much of the region is steppe land, a high plain supporting some flocks and even capable of tillage. Nomadism has long held the region in its grip, however, and it is as a sort of "chief of nomads" that Abdullah Ibn Hussein finds it necessary to rule. He holds his "court" not in a palace but in a group of tents which he moves with the seasons.

Was Center of Greek and Roman Culture

This land now given over largely to nomads is capable of development along stable lines, a fact shown by its past importance. After Alexander's Eastern conquests the cities to the east of the Jordan became Hellenized and were seats of prosperity and culture. In the second century before Christ Ptolemy Philadelphus built in the city which was given his name an extensive acropolis which, in the Amman of today, is only a mass of fallen columns and ruined walls.

Rome's sway over Philadelphia is shown in Amman by the ruins of a huge amphitheater which seated 7,000 spectators. In the sleepy Eastern town of today goats browse among the foundations of temples and public buildings, Arabian coffee shops lean against once-proud walls, and the Eastern species of the village lounger sits on overturned marble pillars. Emir Abdullah is showing keen interest in the ancient structures of his capital and is having the fairly well-preserved amphitheater cleared of debris.

Amman is not inaccessible. Five hours by automobile over reasonably good roads through the sizzling valley of the Jordan suffice for the trip from Jerusalem to the capital. The Jordan forms the boundary line and across it is an iron bridge. Amman is only about 30 miles from the river.

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The Geographic's Notable Service to Schools

ALL The National Geographic Society's activities are educational and scientific; certain phases of its work are especially adapted for public-school use.

The Society's most important service to schools is that rendered through its NATIONAL GEOGRAPHIC MAGAZINE, which, though published primarily for The Society's 850,000 members, now is employed universally in progressive American schools and in all well-equipped school libraries.

Teachers use THE GEOGRAPHIC because its twelve monthly issues contain forty or more fascinating, non-technical, authoritative articles, illustrated by some 1200 photographs, many in full color and velvety rotogravure.

Issues Form Geographic Library Moreover, teachers realize that their GEOGRAPHICS, when preserved and bound, comprise a permanent, reliable, interesting cyclopedia of world geography; useful daily for reference, for problem and project work, and as a source of informing illustrations.

One perquisite of membership in The National Geographic Society appeals especially to teachers—that of receiving the numerous large wall maps and art supplements which are sent to all members without other charge than their payment of the $3.00 annual membership fee, which, of course, includes the 12 issues of THE GEOGRAPHIC.

Pictures in Loose-Leaf Form Recently The Society met the need for separate copies of THE GEOGRAPHIC's illustrations by issuing the sets of loose-leaf pictures, known as The Pictorial Geography, which will be described more fully upon request.

The World War and numerous peace adjustments still in progress brought 700,000 school teachers face to face with an unprecedented problem—that of teaching present-day geography and current events about places and peoples not even mentioned in textbooks or any available reference works.

A Generous Contribution to Schools In this emergency educators called upon The National Geographic Society, which made a remarkable contribution to geography teaching by issuing weekly, without charge, a 12-page Geographic News Bulletin, sent to any teacher who requested it. The Federal government formerly mailed these out under government frank.

The demand for the Bulletins became so heavy that the U. S. Bureau of Education no longer could handle them. However, The Society continues this generous contribution to the schools and The Bulletin is available to teachers who request it with no other charge than their payment of 25 cents to cover the cost of mailing the 30 issues for the school year.

Many Wish Geographics Separately Bound Many single issues of THE GEOGRAPHIC, such as those devoted to Birds, Washington — Capital of Our Country, Wild Animals, Flags of the World, alone would cost the amount of a year's membership if published commercially. Some of these issues, because of their value in nature study, in civics classes, and for visualization, have been separately bound and are frequently listed for required supplementary reading.

Procuring up-to-minute maps offers teachers another perplexing problem, and that problem is solved by large, detailed six-color wall maps issued frequently, as the need arises, to members of The Society. Demand for these maps has led to printing an extra number and mounting copies on linen.

The Story a Map Can Tell Such a map as The Society's 25 x 35 inch map of South America tells 300 pages of facts about the new railways, numerous boundary disputes, unexplored regions, and insets afford whole chapters at a glance about products, climate and physical features.

Society members, including teachers, also frequently wish unfolded copies of The Society's pictures of geographical subjects, either for their own homes or their schoolrooms. Therefore these, too, are sold separately, framed or unframed.

The National Geographic Society is by far the largest scientific and educational body in the world. It is a cooperative, non-commercial, altruistic organization, solely supported by dues of its members.

Geography Is "Livest Subject" Geography is the livest subject in the curriculum today. It is both a cultural and a vocational subject. The effect of the varied phenomena of the world we live in on human life is an engrossing topic of life-long interest. Geography is as essential to modern business and commerce as chemistry and engineering are to the manufacturer.

The Society's School Service Department was created to make The Society's vast resources available to schools, and teachers are invited to call upon this department for any geographic help they need.

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What Causes an Earthquake?

EXACTLY what is an earthquake and what causes it?

These two questions very naturally pop into the minds of millions of persons when a catastrophe such as that which recently occurred in Japan overtakes some great city and causes thousands of deaths.

Superficially the name itself tells the story. It is no more nor less than a quaking of the earth or a part of it; and theoretically any vibration at all fills the bill, from the tremor caused by a heavy truck passing along the street or a blast in a nearby quarry to the most violent convulsion that slides hills from their bases and opens yawning chasms in the earth.

Earth Waves Hold Secret

There is more that needs to be said even by way of a bare definition of an earthquake. The quake in so far as man experiences it is the coming to the surface of waves in the earth. These waves cannot be compared simply to the up-and-down waves of rippled water nor the back-and-forth waves in the air that make sound. Even the simplest wave motion is none too easy to understand; and the waves in the varying earth materials that make themselves known to man as earthquakes probably are the most complex waves that exist. They are at once motions "up-and-down" like sea waves; crosswise like the waves in a flapping flag; back-and-forth like sound waves or the motion in a long coiled spring suspended with a weight bobbing at its end; and in addition may have twists about imaginary pivot lines in all of the three dimensions.

The earth waves originate in some region down in the earth and start out in every direction. The waves from a pebble dropped into a pond form growing circles on the surface of the water. But the waves in the earth being in a solid, attempt to form spheres that constantly grow outward. Soon, however, because of the difference in the rigidity of different rock materials, the form is not a sphere at all but a very irregular curved solid instead, more nearly that of a potato, perhaps.

Two Kinds of Waves

The two principal types of earth waves, those that travel like the pulsations in a bobbing spring, straight out; and those that travel like ripples and the waves in a flag, with a sidewise motion, move at different speeds. The pulsing waves are the swifter, and of course the place where they make themselves felt first and most strongly is the surface area straight above their starting point. This is technically the "epicenter" or "epicentrum." The pulsing waves around the epicenter alternately push up the surface of the earth and everything on it, and let them fall back. This is done very rapidly, and though the actual rise and fall may be only a fraction of an inch on rocky surfaces or a very few inches on soft soil, the violence may be like that from innumerable tremendous blows, and sufficient to shake down buildings.

The "sidewise" waves follow along almost immediately after the first pulsing waves, and the two, with perhaps "twisting waves" as well, then operate

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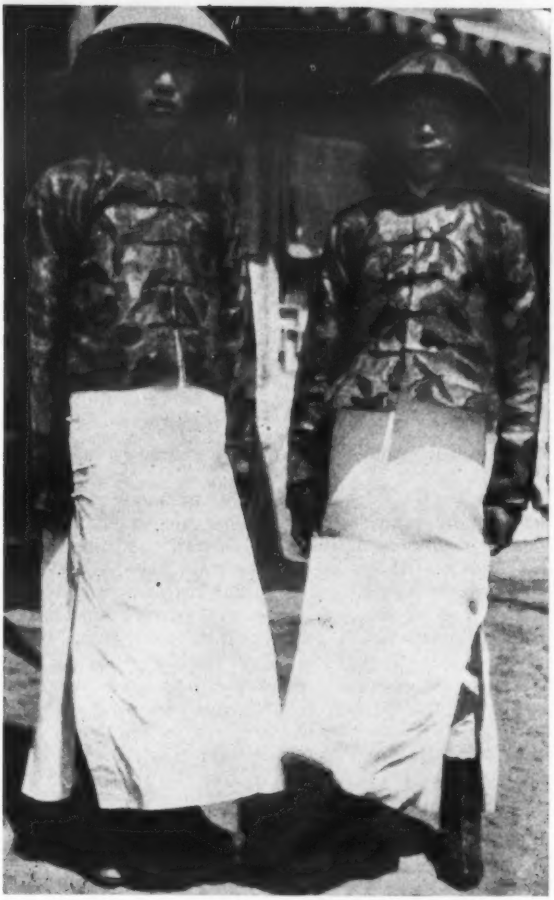

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SCHOOLMASTERS OF MONGOLIA

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School Days Around the World

CHILDREN are "going back to school" all over the northern half of the world.

A Chinese boy's primer, which has been stored away since his older brother used it, would look to little Mexican Manuel like parallel tracks made by his father's best fighting roosters.

Most fortunate of all, in some respects, is tiny Moorish Rahab, whose class room is a corner of shade, outdoors, with the desert sand always at hand for a slate.

The Chinese schoolboy looks like a small edition of his august papa in his cotton trousers and long gown reaching nearly to his feet. He makes a great deal of noise in pursuit of his education. Only boys are allowed in his school because girls must stay at home to help their mothers keep the house, and the teacher has the idea that a boy cannot be doing his duty by his books if he is not yelling out his lessons at the top of his lungs.

His Pen Is a Brush

So when he has yelled to his satisfaction he marches up to teacher, hands her his book, turns his back on her and tells the whole class everything he knows about his lesson. His 'rithmetic he learns by using a frame set with balls much like that used in the modern American kindergartens. He has no pens or pencils and he draws his hundreds of characters with a small brush dipped in ink, which he makes himself by rubbing a cake of India ink in water until he gets the fluid of the right shade.

Though Japanese Yoski-san goes to well-organized schools like ours in America, he has his difficulties. He must learn forty-seven letters in the Japanese alphabet instead of twenty-six in the English language. He also takes off his shoes before he enters the schoolhouse, and when the teacher comes in he must bow his head nearly down to the ground and draw in his breath. This is his way of saying "Good Morning" and the teacher bows in response to the greeting.

Then Yoski-san sits on the floor and uses his knees as a writing desk. When it is time for writing lessons he makes his letters with a little brush very much like that of little Johnny Chinaman, and he writes them from the top to the bottom of the page instead of across the paper as we do. The first page of Yoski-san's book is at the back and he reads toward the front.

Desert Sand Is Schoolroom Floor in Arabia

In Arabia and northern Africa the little boys sit cross-legged on the sand around a turbaned teacher who pounds the earth with a long stick to make the pupils keep time as they recite in unison their verses from the Koran. The Koran, the religious book that is their Bible, is the only textbook used, and they learn it bit by bit and recite it together in rhythmic sing-song, swaying their bodies in accompaniment. Often the teacher is blind, but his unfailing ear enables him to tell just which boy is not keeping up with the others, and that boy gets the benefit of a stout rod.

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together. The ground in the epicentral area, therefore, gets innumerable thrusts and falls and at the same time is jerked sidewise and back for tiny distances in every direction.

At points some distance from the epicenter the pulsing waves strike the surface at a slant and so accentuate the effects of the "sidewise" waves and create new surface undulations. The shaking at the epicenter, too, throws the earth's surface there into undulatory waves like ripples on a pond, and these also travel outward in widening circles. These surface waves are those of greatest motion but least speed. They register the heaviest vibrations on the seismographs of the world.

How the Waves Start

The second important question in regard to an earthquake is: What starts the waves?

No one has ever seen an earthquake wave start outward from its center. But science has built certain hypotheses about the matter that seem to account satisfactorily for the happenings, and which are accepted pretty generally.

Hold a dry stick as big as your thumb in your hands and bend it until it breaks. At the snap waves will travel to your hands and usually give you a quite painful sensation.

Hold an iron bar by one end and strike the other sharply with a hammer. Again the vibrations carried to your hand may be violent enough to produce a stinging pain.

And if you should strike a small explosive cap with the end of a long rod grasped by the other end, the explosion would probably bring the same painful tingle to your fingers.

Breaks Probably Most Important

It is generally believed that earthquake waves flow from a point where one of the three forces illustrated is suddenly released—a break, a blow or an explosion. Breaks are credited with the responsibility for most earthquakes. It is believed that because of slow contraction or shrinking which may result from the cooling of the outer portion of the earth or because of pressure from deposited silt, strains are set up below the surface like those in the bending stick. Eventually the strain reaches the breaking point and there is a snapping of the rocks which sends violent waves to the surface, causing earthquakes.

The blow type of earthquake is probably less important. Such a blow might result from the falling in of a great cavern, but probably would cause only a local shiver. A more important cause of a blow might be a slipping of one mass of rock over another with a collision at the end of the slide. Such a blow often follows a break, the two acting together.

Volcanic Explosions Play Part

Earthquakes in active volcanic regions may often result from explosions of gases far beneath the surface; but it is quite possible that even in the neighborhood of volcanoes the majority of the quakes may arise from sudden breaks in the rocks.

That the earth's "crust" is subjected to squeezing and pinching is evident from mountain ranges, which are the portion of the crust that is "pinched up" as one can pinch up a ridge of skin on his arm. Even now there are certain mountains that are millions of years old yet still are geologically "young" and are slowly rising. The mountains of Japan fall into this class, and it is their "growing pains," so to speak, that cause earthquakes in the Japanese archipelago. Now and then the strains accumulate over a considerable period and the break or slide and collision which finally occurs is violent enough to shake down hills, open wide cracks and destroy cities.

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How Sugar Is Made

WHEN the price of sugar fluctuates every American home is affected.

The process by which this universally used commodity is obtained from sugar cane is described by William Joseph Showalter, in an article in The National Geographic Magazine which follows, in part:

"In harvesting, the cane-cutters first strip the blades from the stalk; then they cut off the upper part of the latter, which is worthless except for replanting, since what juice it contains possesses very little sugar. One of the strange things about sugar-cane is that the sap of the growing plant has little sugar, while in the mature stalk the juice is rich in sucrose. The action of the sun's rays seems to transform glucose into sucrose—a transformation that cannot be accomplished by human means.

Sugar by the Ton

"The main body of the stalk is cut down and loaded into the ox-carts. In these it is hauled to the field station and placed in the waiting cars. Each car contains about twenty tons and each train is made up of thirty cars. This makes six hundred tons of cane to the trainload, and eight to ten trainloads a day are required to keep one of the bigger centrals in operation for twenty-four hours.

"When the cane reaches the mill in the most modern plants, the cars are run, one by one, into a cradle and made fast thereto. A button is pressed and the cradle rocks over on one side. The side of the car swings loose and the load rolls out into a deep trench, at the bottom of which is an endless steel belt.

"On this belt the cane is carried up to the crushing rolls. A man stands before a keyboard and by pressing the several electric buttons thereon regulates the flow through the crusher, which disrupts all the little sap cells and releases a great stream of foamy juice. Then the crushed cane is sent through sets of rollers, each time under heavy pressure.

"Each set of rolls the cane passes through presses it harder than the one before. The last set may exert a pressure of a million pounds, and when the 'bagasse,' as the crushed cane is called, issues from them it is almost as dry as tinder. It is carried by conveyors to the fire-boxes of the boilers, where it is used as fuel in generating the steam that drives the big mills and boils the cane juice. The stream of crushed cane flows through the last set of rolls at a speed of seven miles a day.

Mixing Whitewash With Cane Juice

"Imagine big gear-wheels fourteen feet in diameter, with cogs sixteen inches long, three inches deep, and two inches thick on their face. Such are the trains of gears that transmit the power from the engines to the rolls.

"After the juice is pressed out of the cane it is thoroughly strained and pumped into big tanks at the top of the building, where a milk-of-lime solution —in other words, plain whitewash—is added.

"The mixture is then heated to a degree just above the boiling point. The

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All the rest of the knowledge the desert boys get they must learn at home. Their fathers must teach them to fly kites, ride their ponies and shoot straight.

Korean schools are much like those of China and Japan. The boys sit cross-legged on mats on the floor, say their lessons out loud, and learn the sayings of great men.

Twelve-Hour School Day in India

Persian boys learn the Koran, too, as about 98 per cent of the people are Mohammedans, but modern schools are increasing. Often one sees a class sitting on the floor of the porch of some old building, hundreds of years old, droning lessons. About 95 per cent of the Persian women can't read or write; it is only within recent years that they have been allowed to attend schools at all. Formerly they were married off at ten or twelve years of age.

The mothers of the children of India have little worry with their children after they have become of school age, for classes begin at six o'clock in the morning. At nine o'clock there is an hour for breakfast and at two o'clock an hour for dinner. Then the pupils go back to school until evening. Very often they have no desks or pencils or paper. The teachers write the letters in the sand on the floor and each boy copies the letters on the sand before him. There are some larger and better schools in India, particularly in Kashmir, where boys are being trained in athletics and ethics as well as in ordinary academic work. The 600 pairs of shoes piled before the doorway of the school in Srinagar bear witness to the number of barefooted lads who are sitting at their desks inside the building.

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TRANSFERRING SUGAR CANE FROM OX-CARTS TO RAILROAD CARS, ON A CUBAN SUGAR PLANTATION. (See Bulletin No. 4.)

A modern sugar factory, or "central," as it is known in Cuba, may require 250 acres of cane a day to keep it running at capacity. Consequently great areas of sugar land are tributary to each central, and a complete railroad system is necessary to supply the cane in sufficient quantity. At these field-loading stations the cane is weighed in the loading process.

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Bulgaria Is Home of Costliest Perfume

ROSES did not do so well in Bulgaria this year.

This is not the casual statement that it may appear. It amounts to a great deal more than a statement, for example, that California's poppies are suffering, that the blue-bonnet crop is not up to the standard in Texas, or that the daisies in Maryland are scarcer than usual.

Roses Bread and Butter Crop

Roses are not merely things of beauty in Bulgaria. They constitute a real crop, and mean as much to some parts of the country as cotton means in Georgia or potatoes in Maine. It is literally true that the rose means bread and butter to thousands of Bulgarian country folk. Great fields of roses are grown that each petal may be made to yield its infinitesimal share of attar of roses, the last word—and the most expensive—in perfumery.

It is in the valleys on the southern slopes of the Balkans that roses have been grown for generations for the perfumery industry, for there the climate, soil and drainage are just right in normal seasons for this most exacting flower. Before the World War there were probably between 25,000 and 50,000 acres of rose gardens in the Bulgarian "rose belt," and the annual yield of the attar was about 150,000 ounces. During war time roses gave way to the tobacco plant whose particular fragrance was more appreciated by the millions of men under arms. Since the war rose-growing has recovered, but in no postwar year has the acreage climbed above 15,000.

Most Concentrated "Agricultural Product"

Attar of roses is one of the most concentrated "agricultural products," if it may be so called, produced anywhere in the world. The countless rose petals grown on an acre yield only a few tablespoonfuls of the fragrant oil. The attar is in effect the materialized and captured fragrance of the rose, and probably 50,000 or more flowers must contribute their share in making each ounce of the completed product.

The roses are largely gathered before sunrise, or at least before the dew has dried; for the moisture helps to preserve the fragrance. The peasants seem to enjoy their aesthetic job. Troops of gaily dressed girls and young men go through the gardens stripping the buds from the plants. They are dumped in piles before older women, who sort them in readiness for their trip to the nearby factories. The buds are placed in retorts with about twice their weight of water and the liquid is then distilled. The resulting liquor is allowed to stand over night in pans. By morning a thin film of a solid oil has risen to the top. This, the attar, is skimmed off carefully, and the remaining rose water is in most cases thrown away.

The genuine attar of roses is so strong that its odor is not very pleasant. When combined with other materials and so properly diluted, however, the fragrance is delightful. One drop is sufficient to give a pleasing rose odor to a gallon of cologne.

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lime neutralizes the acid in the juice and finds affinities in some of the foreign substances. It pulls these to the bottom and plays the same role of purifier in the making of sugar that it plays in the making of iron. The heat causes the other impurities to rise to the surface as scum, so that when this preliminary process is completed in the big settling tanks there is a top layer of froth, a middle layer of clear juice, and a bottom layer of mud-like solid material.

"The clear juice is drawn off and passes through filters of excelsior. It is then pumped to the evaporators, where about half of the water is boiled out of it.

How the Evaporator Works

"In the more modern factories there is a chain of four evaporators working together. We all learn in our school days that the lighter the air pressure, the lower the temperature at which liquids boil. The sugar manufacturer makes use of that principle in his factory. By means of air pumps he reduces the atmospheric pressure in each evaporator to a point below that of the preceding one.

"The steam that boils the juice in the first evaporator must have a temperature of 215 degrees Fahrenheit. When this steam falls below that temperature it passes into the coils of the second evaporator, where the air pressure is so reduced that the partially cooled steam makes the liquid boil at 203 degrees. After it falls below that point the steam passes on to the third evaporator, where, with a still further reduced air pressure, it is able to keep the syrup boiling until it falls below 180 degrees. The fourth evaporator has the air pressure reduced to a practical vacuum.

"The steam that has lost so much of its heat as to be unable to maintain the boiling-point in the third is nevertheless hot enough to keep the juice boiling in the fourth. Here only 150 degrees of heat is needed to maintain the boiling pressure. By this arrangement the juice is boiled to the proper consistency with only one-fourth of the heat otherwise required.

Drawn Into Vacuum Pans

"The next step in the making of sugar is to draw the thick juice into vacuum pans. Here it comes into contact with hot steam coils and boils at a very low temperature because of the absence of atmospheric pressure. As the boiling proceeds, the sugar crystallizes into small grains. The man in charge of a big vacuum pan is known as the sugar master. From time to time he adds fresh juice, and its sugar gradually settles on the crystals already formed, which thus are made to grow larger.

"Finally the vaccum pan becomes full of sugar and mother syrup. The sugar and the adhering syrup are then removed to a centrifugal machine that acts somewhat on the principle of a cream separator. Placed inside a perforated basket and whirled around at from 1,000 to 1,400 revolutions a minute, all of the syrup is forced out through the perforations, while the crystallized sugar remains behind.

"This syrup is boiled again, after which it goes to the crystallizer, a huge revolving tank, in which a seed bed of crystals from the vacuum pan has been prepared. There it gradually deposits its sweetness on these crystals, and, when it has given up all that is worth waiting for, the mixture goes back to the centrifugal machines, where its adhering syrup is hurled out from this second lot of crystals. The process is repeated again, and by this time all the available sweetness has been extracted, and the remaining liquor is the 'blackstrap' molasses of commerce.

"The principle of producing sugar is embodied in the fact that water can hold only a given amount of sucrose in solution. As the water is driven out of the cane juice the latter finally reaches a stage where there is not enough left to hold all the sugar dissolved, and as evaporation proceeds, the sugar, deprived of its water, is compelled to pass out of solution into crystal form."

Rose Attar Has Reached $100 an Ounce

In 1919 the United States imported over a thousand pounds of attar of roses from Bulgaria. Its cost there was only $150 a pound. The price of the attar is much greater, of course, by the time it reaches the consumer. The best grades have sold at times for $100 or more an ounce.

Though Bulgaria is perhaps the best known source of attar of roses, it has no monopoly of the production of this most highly prized of perfumes. In the celebrated Vale of Kashmir, in some parts of China, in some of the oases of Persia, in Egypt, and in Asiatic Turkey the flowers from many acres of roses are concentrated in much the same way. The industry has even invaded the West and is carried on near Leipzig, Germany, and around the famous "City of Perfumes," Grasse, in southern France.

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TEACHERS AND PUPILS OF A MISSION SCHOOL IN NAURU (See Bulletin No. 3).

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